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As an earnest of better methods we are glad to note the appointment of E. L. Scribner as assistant botanist to the Department of Agriculture. He has been assigned the care of the cryptogamic portion of the herbarium, and will devote most of his time to the study of the parasitic fungi, especially those which affect injuriously the field and garden crops.—The April number of *Nuovo Giornale Botanico Italiano* contains an exhaustive paper, by Danielli, upon the structure of *Agave americana*. It is illustrated by seven large plates containing eighty-one figures.

ENTOMOLOGY.

THE BLACK, WHEAT-STALK ISOSOMA (*ISOSOMA NIGRUM*, n. sp.)—Early last autumn I received from Mr. Wm. Deyo, of Denton, Wayne county, Michigan, specimens of wheat straw which contained from five to sixteen larvæ of a four-winged (hymenopterous) fly. The portion attacked was usually near a joint, but might be anywhere along the internode, and was found above every joint, though very rarely above the highest one. The immediate region of attack was creased and deformed (Fig. 1),



FIG. 1.—Black dots show exit of fly.

though not swollen, and was very hard, so that to cut it, except with a very sharp knife, was difficult. At this portion of the stalk, which was usually from three centimeters (one and a-fifth inch) to five centimeters (two inches) long, the straw was not hollow but solid throughout. By cutting into this deformed straw the yellowish-white larvæ were found in oval cells. These cells were about four millimeters (.16 of an inch) long. I published an account of this fact in several papers of Michigan and other States (see *Country Gentleman*, Vol. 49, p. 817) asking for further information. In response to these inquiries I received several communications from Wayne and Washtenaw counties, Michigan, in both of which the insect worked extensively.

So far as I can learn the insect has never been noticed before; and as the hardened pieces of straw break off in thrashing and come out of the machine with the grain, their presence could hardly escape attention. Mr. I. S. Vandervort, of Ypsilanti, Michigan, to whom I am indebted for many specimens, says the attack was quite general in Washtenaw county, and that the short straws in the grain had been noticed and commented upon by many farmers who had not even mistrusted that insects had anything to do with it. At our Farmers' Institute held at Plymouth, in January, I found hardly a farmer who had not been vexed by the small pieces of straw, yet not one had discovered the cause.

In the *Country Gentleman*, Vol. 49, p. 857, Professor J. A. Lintner refers to similar attacks of wheat in New York, and says the cause is the same species that has done so much damage in

Illinois and south—*Isosoma tritici*; yet from the brief description I think it far more likely that *Isosoma nigrum* is the insect which is doing the damage in New York. The farmers in Wayne and Washtenaw counties are not sure that the damage was very great, but all reported the wheat yield below their expectations. Professor Lintner estimated the loss in New York to be from sixty to seventy-five per cent in such stalks as were attacked.

Isosoma nigrum n. sp.—Female (Fig. 2): Length of body 4.4^{mm}; expanse of wing 6.5^{mm}; greatest width of anterior wing 1.1^{mm}; antennæ sub-clavate, somewhat pilose, reach to middle of thorax. The scape is a little less hairy, and as long as the two following joints together. The fourth, fifth, sixth and seventh joints sub-equal. Ten of the eleven joints are plainly marked when viewed with a hand-glass. Head and thorax black, dull, punctate, rugose and covered, though not densely, with fine gray hairs. Abdomen shining black, polished sparsely hairy; as long as head

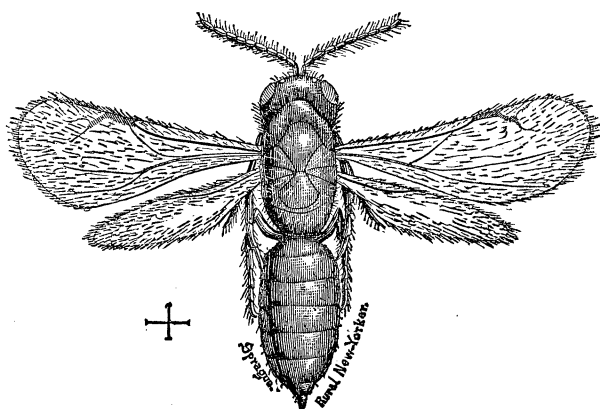


FIG. 2.—Female *Isosoma nigrum* n. sp. Magnified ten diam.)

and thorax together and larger than thorax. The antennæ, including scape, mouth-parts, head, abdomen and thorax, except a small, rounded, light-colored spot on the pronotum just back of the eyes, are pitchy black. The trochanters, femora, middle and posterior tibiæ black. The anterior tibiæ, tibio-femoral joints, one-third of distal end of anterior femora, and tarsi are yellowish-brown. In some cases the distal ends of the tarsi are dusky. The legs are thickly pilose. The wing-veins are honey-yellow and extend to outer third of wing. Sub-marginal vein three times as long as marginal; marginal nearly twice as long as post-marginal; post-marginal and stigmal sub-equal. Described from more than 100 specimens. Wings in all perfect. Variations very slight.

The eggs (Fig. 3) are white, 75 to 100 in number; 1^{mm} long, and each with a

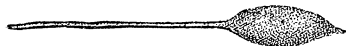


FIG. 3.—The egg.

pedicel two and one-half times as long as the egg.

Male; Length of body 3^{mm}; expands 5.8^{mm}; greatest width of front wing 1.3^{mm}; antennæ sub-cylindrical, longer than in the female, with more and longer hairs; the last seven joints sub-equal. Thorax and abdomen as in the female, except that the pronotal spot is wanting or very obscure; the abdomen slightly peduncled, shorter and hardly larger than the thorax. Coloration of body and appendages same as in female. Venation similar to that of female. The wings in both sexes are margined with hairs, which are rather coarse along the marginal and post-mar-

ginal veins. The general surface of the wings show numerous short hairs. The males are nearly as numerous as the females, and all have perfect wings.

Larva: The larva (Fig. 4) is yellowish-white; length 4^{mm}; jaws dark, without teeth. The antennæ are short, one-jointed tubercles of the same color as the body. Very few hairs. Stigmata very obscure.

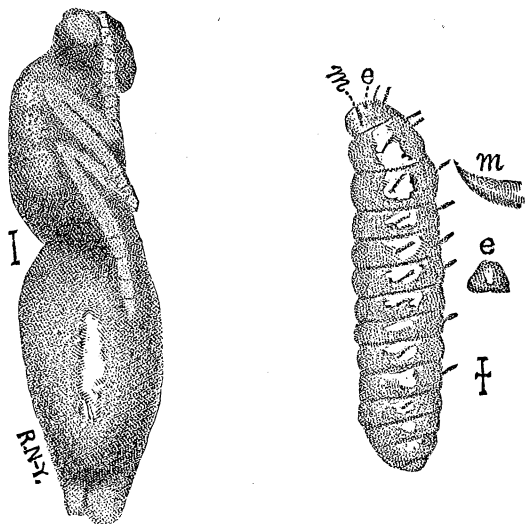


FIG. 4.—Larva and pupa. *m*, mandible; *e*, antennæ.

Pupa (Fig. 4): In autumn and winter white; in late spring black. Length 4.1^{mm}; male 3.2^{mm}. In autumn the wing pads are very indistinct, hardly visible, but in spring they are plainly marked.

This insect is very different from the *I. tritici* (Riley), (first described in the *Rural New-Yorker* of March 4, 1882), in being much larger, in its black scape in antennæ, black mesoscutum, black coxæ, light instead of yellow pronotal spot, the numerous males and the fact that all are winged. These work to the number of from five to fifteen at one place in wheat stems, instead of one or two, and the stalk solidifies. The larva has no teeth on its mandibles and only one joint to the tubercle-like antennæ. It differs from *I. grande* (Riley) but little in size; but in other respects the points of difference are much as above.

From the old joint-worm of Fitch (*I. hordei* Harris) it differs in being larger, in having a black scape to antenna, black mouth-parts, and in working in great numbers in a single straw, in causing the straw to solidify, in not forming a swelling and in working anywhere on the internodes of the straw.

From *I. elymi* (French) it differs in being much larger, and the legs are not so fully fuscous. *I. elymi* works in grass, which is probably true also of this species, yet they must be quite distinct, as shown by sizes.

Dr. C. V. Riley kindly informs me that he thinks this is *I. hordei*. He says he has specimens from Virginia, right where

the original types were found, some of which have a yellow scape, others a black one. He thinks this is Fitch's variety *tritici*. I at first thought this *hordei*, but the fact that Fitch makes no mention of any specimens with other than a yellow scape and yellow mouth-parts, and inasmuch as Dr. Harris and the late B. D. Walsh, with Fitch's descriptions before them, say all of Fitch's varieties are exactly alike except in coloration of legs, added to the fact that of the hundreds of specimens examined by me, not one showed any tendency to vary from black in scape and mouth-parts, while there was considerable variation in the coloration of the legs, led me to believe that my specimens were of a distinct species.

The fact, as Dr. Riley writes me, that so accurate a scientist as Dr. Harris does not speak of the yellow scape and mouth-parts would indicate that *nigrum* and *hordei* were identical.

Another entomologist, who has made quite an extensive study of these *Isosoma*, writes me that he inclines to the opinion that all our *Isosoma* are only varieties of one species modified by surrounding conditions.

It will take much observation to clear all this up. As species are only venerable varieties, which by age have been run into the mold of invariability, it really makes no great difference. Practically the matter remains the same in either case.

From what we know of related species, and from the fact that all the internodes (spaces between the joints) are attacked, or receive eggs, it is quite certain that the eggs are laid late in May and in June. By September the larvæ are matured. I found several pupæ in the cells of the straw on September 16. I found a few larvæ in January. It would seem, then, that a few of the insects pass the winter in the larval state. Specimens kept in a warm room all winter commenced to leave the cells in the wheat stalks, as mature insects, on March 22. At that date a male and female appeared. Each succeeding day ever since from two to eight have appeared. From straw kept in a cold room during the winter no flies have appeared until April 20. It is likely that in the common out-door temperature they would not come forth from the pupa state till May. This point can be easily settled in the field the coming season. This and the date and method of laying will have to await determination till the insects can be studied in the field the coming May. The method of oviposition is undoubtedly much like that of *I. grande* and *I. tritici*, as described by Mr. F. M. Webster (see Report Department of Agriculture, 1884, page 383), and Dr. C. V. Riley in the same volume, page 358.

If we may judge from the related insects, *Isosoma hordei* (see Fitch, 7th report, p. 162) or *Isosoma tritici* (see Forbes, 13th report, State Entomological Illinois, p. 30, and Riley, Report United States Department of Agriculture, 1881-2, p. 183) we

may be quite certain that the damage from this insect may become formidable. If, as I think, the insects referred to by Professor Lintner are of this species, then we have positive evidence that they lessen the yield of wheat very materially. Indeed, we can hardly believe that so many larvæ can draw from the juices of the stalk without doing it serious injury. The hardening of the stalk can but retard circulation of sap, and must interfere decidedly with the growth and development of the berry. Several farmers have told me that from appearances the yield of grain in their fields should have been much larger. They could not account for the diminished yield except by the presence of this insect, which was very common, as seen in the numerous hardened pieces of straw which came from the machine. It is therefore greatly to be feared that this new pest will become a serious enemy to successful wheat raising, especially as from a large number I have reared but a single parasite, which as yet is undetermined. Even if it becomes very destructive, it is more than probable that parasites will soon attack it, and that, like the joint-worm (*Isosoma hordei*), it will after a time become powerless to work very serious mischief.

The remedies for this evil are very apparent. As the insects are in the straw from the date of cutting till the following May, it becomes very apparent that by cutting the wheat high, in which case nearly all the insects will remain in the stubble, and then burning the latter, all these will be destroyed. In case there is much green vegetation, it would be better to cut the stubble low before burning. If short pieces of the straw are found in the grain, these should be cleaned out and burned. From experiments made in the laboratory, by burying the straws in sand, and the insects still coming out, I doubt if plowing under will prove a very thorough remedy. As these have good fully-developed wings, rotation of crops would not serve as well to protect against this insect as it would in case of *I. tritici* and *I. grande*.

The drawings were made from life by my special student in entomology, C. P. Gillett.—*Prof. A. J. Cook, Agricultural Coll., Lansing, Mich.*

ENTOMOLOGICAL NEWS.—The Rev. J. A. Marshall publishes in the Transactions of the Entomological Society of London, issued April 30, Part I (280 pages) of a detailed monograph of British Braconidæ. The generic and specific characters are given in full, and there are six excellent colored plates. It will prove very useful for reference in this country.—Part III of Rev. A. E. Eaton's elaborate monograph of recent Ephemeridæ is at hand, and is accompanied by Plates 46–63, containing figures of very great interest, particularly Pl. 52, representing the nymph slough of *Bætisca obesa*, the aberrant and curious American form.—Bulletin 5 of the Bureau of Entomology, U. S. Department of

Agriculture, consist of descriptions of North American Chalcididæ from the collections of the U. S. Department of Agriculture and of Dr. C. V. Riley, with biological notes, together with a list of the described North American species of the family, by L. O. Howard. This paper will be followed by others, and will prove of great service to entomologists.—It appears from the observations of C. Aurivillius, reported in the *Entomologists' Monthly Magazine* for May, that *Eneis bore*, an arctic butterfly, requires two or more summers to complete its transformations; also that humble bees probably require more than one summer to mature.—At the meeting of the Entomological Society of London, held April 1st, Mr. R. M. Christy exhibited a drawing of the larvæ of the local form of *Platysamia columbia*, known as Nokomis; he had found the larva in Canada feeding on *Elæagnus argentea*, the peculiar silvery appearance of which was strikingly in accord with the color of the larva, which latter was probably protected thereby.—At a sale of beetles in London a pair of *Goliathus giganteus* realized £10 10s. 6d., and a pair of *G. albosignatus* £7 10s.; a pair of *Rhætus westwoodii* sold for £8, and a pair of *Rhætulus crenatus* sold for £2 10s.

ZOOLOGY.

SENSE OF COLOR AND OF BRIGHTNESS IN ANIMALS.—J. Graber has investigated the sense of color and of illumination in animals. To decide whether animals had a sense of light or of color he placed them in a box so arranged that qualitative and quantitative rays fell on one or other of its two divisions, which communicated with one another. Five mammals, seven birds, two reptiles, three amphibians, two fishes, three mollusca, twenty-seven insects, two spiders, and two worms were experimented with. It was found that the sense of color as well as the power of perceiving light was much more widely distributed among animals than has been generally supposed. The variations in the sense of color in various animals are very great, but a much greater number of observations must be made before a definite solution of the problem can be obtained.—*Journal of the Royal Microscopical Society, February, 1885.*

ARTIFICIAL DIVISION OF INFUSORIA.—Mr. Crisp at a late meeting of the Royal Microscopical Society called attention to some very interesting experiments by Dr. Nussbaum and Dr. Gruber on the artificial division of Infusoria. Dr. Nussbaum divided an *Oxytricha* into two halves, either longitudinally or transversely, and found the edges at the point of division were soon surrounded with new cilia. Notwithstanding that sometimes some of the body substance, or even a nucleus, was lost during the operation, the two halves became normal animals, with four nuclei and the characteristic ciliary apparatus. The head portion formed a new